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CLAIMS

1. A method of displaying an image with a display device, the method comprising:

receiving image data for the image, the image data comprising a first set of pixels;

generating first and second sub-frames, wherein the first and the second sub-frames comprise a second set of pixels, wherein each of the second set of pixels is centered relative to one of the first set of pixels; and

alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

2. The method of claim 1 further comprising:

generating third and fourth sub-frames, wherein the third and the fourth sub-frames comprise the second set of pixels, wherein each of the second set of pixels is centered relative to one of the first set of pixels; and

alternating between displaying the first sub-frame in the first position, displaying the second sub-frame in the second position spatially offset from the first position, displaying the third sub-frame in a third position spatially offset from the first position and the second position, and displaying the fourth sub-frame in a fourth position spatially offset from the first position, the second position, and the third position.

3. The method of claim 2 further comprising:

generating a simulated image by convolving the first, the second, the third, and the fourth sub-frames with an interpolating filter.

4. The method of claim 3 wherein the interpolating filter comprises a 3x3 interpolating filter with nine filter coefficients.

5.   The method of claim 4 wherein the nine filter coefficients comprise first, second, and third rows which each comprise three coefficients, wherein the three coefficients of the first row have values of 1/16, 2/16, and 1/16, respectively, wherein the three coefficients of the second row have values of 2/16, 4/16, and 2/16, respectively, and wherein the three coefficients of the third row have values of 1/16, 2/16, and 1/16, respectively.

6.   The method of claim 4 wherein the nine filter coefficients comprise first, second, and third rows which each comprise three coefficients, wherein the three coefficients of the first row have values of 0, 1/8, and 0, respectively, wherein the three coefficients of the second row have values of 1/8, 4/8, and 1/8, respectively, and wherein the three coefficients of the third row have values of 0, 1/8, and 0, respectively.

7.   The method of claim 3 further comprising:

generating an error image by subtracting the simulated image from the image data.

8.   The method of claim 7 further comprising:

generating fifth, sixth, seventh, and eighth sub-frames using the error image and the first, the second, the third, and the fourth sub-frames.

9.   The method of claim 3 further comprising:

generating an error image by subtracting the simulated image from the image data to generate error data and by convolving the error data with an error filter.

10.   The method of claim 9 wherein the error filter comprises a 3x3 error filter with nine filter coefficients.

11.   The method of claim 10 wherein the nine filter coefficients comprise first, second, and third rows which each comprise three coefficients, wherein the three coefficients of the first row have values of 1/16, 2/16, and 1/16, respectively, wherein the three coefficients of the second row have values of 2/16, 4/16, and 2/16, respectively, and wherein the three coefficients of the third row have values of 1/16, 2/16, and 1/16, respectively.

12.   The method of claim 9 further comprising:

generating fifth, sixth, seventh, and eighth sub-frames using the error image and the first, the second, the third, and the fourth sub-frames.

13.   A system for displaying an image, the system comprising:

a buffer adapted to receive image data for the image, the image data comprising a first set of pixels;

an image processing unit configured to define first, second, third, and fourth sub-frames comprising a second set of pixels, wherein each of the second set of pixels is centered on one of the first set of pixels; and

a display device adapted to alternately display the first sub-frame in a first position, the second sub-frame in a second position spatially offset from the first position, the third sub-frame in a third position spatially offset from the first position and the second position, and the fourth sub-frame in a fourth position spatially offset from the first position, the second position, and the third position.

14.   The system of claim 13 wherein the first set of pixels comprise a plurality of pixels at a first resolution, and wherein the second set of pixels comprise a plurality of pixels at a second resolution less than the first resolution.

15.   The system of claim 13 wherein the image processing unit is configured to generate a third set of pixels for a simulated image by convolving each of the second set of pixels with at least four other pixels from the second set of pixels.

16.   The system of claim 15 wherein the image processing unit is configured to generate an error image by subtracting the simulated image from the image data, and wherein the image processing unit is configured to generate fifth, sixth, seventh, and eighth sub-frames using the error image and the first, the second, the third, and the fourth sub-frames.

17.   The system of claim 16 wherein the image processing unit is configured to generate first, second, third, and fourth correction sub-frames from the error image, wherein the image processing unit is configured to generate the fifth, the sixth, the seventh, and the eighth sub-frames by multiplying each of the first, the second, the third, and the fourth correction sub-frames by a sharpening factor and adding the first, the second, the third, and the fourth sub-frames to the first, the second, the third, and the fourth correction sub-frames, respectively.

18.   The system of claim 15 wherein the image processing unit is configured to generate a plurality of error data values by subtracting the simulated image from the image data, wherein the image processing unit is configured to generate an error image by convolving each of the error data values with eight adjacent error data values, and wherein the image processing unit is configured to generate fifth, sixth, seventh, and eighth sub-frames using the error image and the first, the second, the third, and the fourth sub-frames.

19.   The system of claim 18 wherein the image processing unit is configured to generate first, second, third, and fourth correction sub-frames from the error image, wherein the image processing unit is configured to generate the fifth, the sixth, the seventh, and the eighth sub-frames by multiplying each of the first, the second, the third, and the fourth correction sub-frames by a sharpening factor and adding the first, the second, the third, and the fourth sub-frames to the first, the second, the third, and the fourth correction sub-frames, respectively.

20.   A system for generating first, second, third, and fourth sub-frames for display at spatially offset positions to generate the appearance of an image comprising:

    means for receiving image data corresponding to the image;

    means for generating the first, the second, the third, and the fourth sub-frames using the image data, each of the first, second, third, and fourth sub-frames comprising a plurality of sub-frame pixel values; and

    means for calculating a plurality of simulated image pixel values for a simulated image by convolving each of the sub-frame pixel values with at least four other sub-frame pixel values.

21.   The system of claim 20 further comprising:

    means for generating an error image from the simulated image and the image data.

22.   The system of claim 21 further comprising:

    means for generating fifth, sixth, seventh, and eighth sub-frames using the error image, a sharpening factor, and the first, the second, the third, and the fourth sub-frames.

23.   The system of claim 20 wherein the means for calculating includes means for calculating the plurality of simulated image pixel values for the simulated image by convolving each of the sub-frame pixel values with at least eight other sub-frame pixel values.

24.   The system of claim 23 further comprising:

    means for generating a plurality of error data values from the simulated image and the image data; and

    means for calculating a plurality of correction pixel values for an error image by convolving each of the error data values with at least eight other error data values.

25.   The system of claim 24 further comprising:

means for generating fifth, sixth, seventh, and eighth sub-frames using the error image, a sharpening factor, and the first, the second, the third, and the fourth sub-frames.

26.   A computer-readable medium having computer-executable instructions for performing a method of generating sub-frames for display at spatially offset positions to generate the appearance of an image, comprising:

receiving a first image;

generating first, second, third, and fourth sub-frames based on the first image; and

generating a simulated image by convolving the first, the second, the third, and the fourth sub-frames with an 3x3 interpolating filter the comprises a first set of nine filter coefficients.

27.   The computer-readable medium of claim 26 wherein the nine filter coefficients comprise first, second, and third rows which each comprise three coefficients, wherein the three coefficients of the first row have values of 1/16, 2/16, and 1/16, respectively, wherein the three coefficients of the second row have values of 2/16, 4/16, and 2/16, respectively, and wherein the three coefficients of the third row have values of 1/16, 2/16, and 1/16, respectively.

28.   The computer-readable medium of claim 26 wherein the nine filter coefficients comprise first, second, and third rows which each comprise three coefficients, wherein the three coefficients of the first row have values of 0, 1/8, and 0, respectively, wherein the three coefficients of the second row have values of 1/8, 4/8, and 1/8, respectively, and wherein the three coefficients of the third row have values of 0, 1/8, and 0, respectively.

29.   The computer-readable medium of claim 26 having computer-executable instructions for:

generating an error image by subtracting the simulated image from the image data.

30.   The computer-readable medium of claim 29 having computer-executable instructions for:

generating fifth, sixth, seventh, and eighth sub-frames using the error image and the first, the second, the third, and the fourth sub-frames.

31.   The computer-readable medium of claim 26 having computer-executable instructions for:

generating an error image by subtracting the simulated image from the image data to generate error data and by convolving the error data with an error filter.

32.   The computer-readable medium of claim 31 wherein the error filter comprises a 3x3 error filter with a second set of filter coefficients, wherein the nine filter coefficients comprise first, second, and third rows which each comprise three coefficients, wherein the three coefficients of the first row have values of 1/16, 2/16, and 1/16, respectively, wherein the three coefficients of the second row have values of 2/16, 4/16, and 2/16, respectively, and wherein the three coefficients of the third row have values of 1/16, 2/16, and 1/16, respectively.

33.   The computer-readable medium of claim 31 having computer-executable instructions for:

generating fifth, sixth, seventh, and eighth sub-frames using the error image and the first, the second, the third, and the fourth sub-frames.